User Guide

hp StorageWorks iSCSI Feature Pack

Product Version: Version 1.5

First Edition (September 2004)

Part Number: T3662-90901

HP StorageWorks iSCSI Feature Pack for HP NAS products provides virtualization, allocation of disk storage, and centralized management for iSCSI host applications.

hp StorageWorks iSCSI Feature Pack User Guide
First Edition (September 2004)
Part Number: T3662-90901

Contents

Introduction

With an ever-expanding need for storage, it has become increasingly desirable for small and medium-sized businesses to consolidate and centralize all of their data.

While Windows-powered HP StorageWorks NAS products have addressed some of their file-level needs, consolidation/centralization of block-level storage for applications such as databases and messaging servers has been difficult for these businesses because of a lack of resources to address the costs and complexity of supporting a Storage Area Network. As a result, the majority of small and medium business databases and messaging servers are still using direct attached storage and storage administrators are facing increasing manageability problems.

The advent of a standard iSCSI protocol holds the promise of allowing these businesses to have their applications access centralized storage using their existing, familiar IP network infrastructure.

What is iSCSI?

You are probably already familiar with the Small Computer Systems Interface (SCSI) which enables host computers to perform block-level data I/O to a variety of peripheral devices (such as disk and tape devices and printers). The Internet SCSI (iSCSI) protocol adds dimension to SCSI and eliminates the distance limitation associated with it by enabling block-level I/O over the IP network.

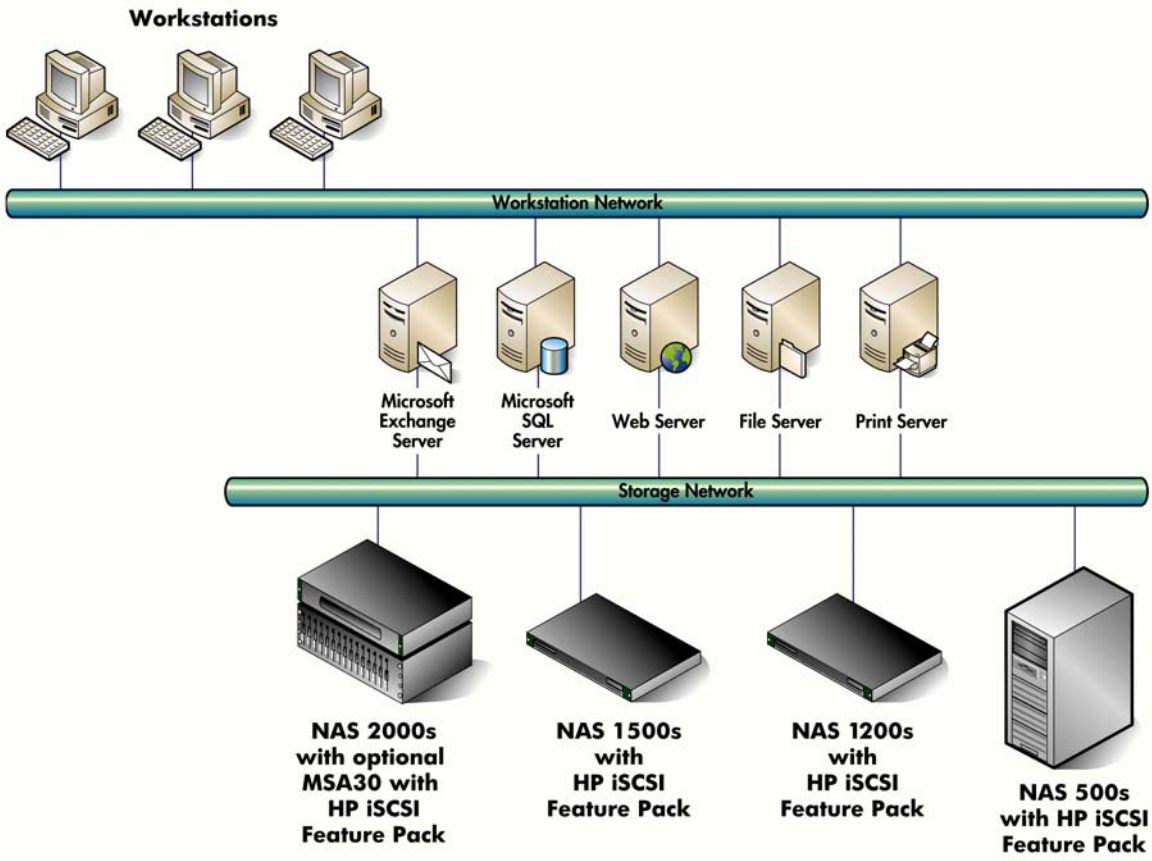
With its ability to simply attach servers and storage devices into your existing network infrastructure, iSCSI enables your organization to cost-effectively build and manage a storage area network based on technologies (SCSI, IP) you already understand and use.

HP StorageWorks iSCSI Feature Pack

HP StorageWorks iSCSI Feature Pack for HP StorageWorks NAS products provides virtualization, allocation of disk storage, and centralized management for iSCSI host applications.

HP iSCSI Feature Pack is comprised of a Windows-compatible iSCSI target driver and an iSNS (Internet Storage Name Service) server. All software management has been integrated under a tabular “iSCSI” window in the Windows Server 2003 **Web Administration** screen.

The following figure illustrates how your NAS system provides file-level storage for your workstations, and how your iSCSI Feature Pack provides block-level storage for your application and file servers.



Getting Started

The following steps provide an overview of the tasks you must complete to configure your system. To install the iSCSI Feature Pack software:

1. **For systems with a DVD/CD-ROM drive:**

   a. Insert the iSCSI Feature Pack installation CD into your CD-ROM.

   b. Click `setup.exe`.

2. **For systems without a DVD/CD-ROM drive**, you can either share the CD from another system, or copy the CD across the network.

   a. To share the CD from another system:

   - Insert the CD into another system and share out that system's DVD/CD-ROM drive.
   - From the NAS storage server, map a drive to the CD share and install from it. You can map to the DVD/CD share from your iSCSI storage server via Windows Terminal Services client,or via Remote Desktop if you do not have a monitor on your NAS storage server.

   b. To copy the CD across the network:

   - Create a directory on the C: drive of the NAS system (e.g. C:\iSCSI), and make it a share with Full Control (read/write permission).
   - Connect to the share from a remote system that has a CD-ROM drive using the Microsoft File Explorer.
   - From the remote system, copy the contents of the CD-ROM to the share on the NAS system.
   - On the NAS system, use My Computer or the File Explorer to browse the directory that was created (e.g. C:\iSCSI). The contents of the iSCSI Feature Pack CD will now be in the directory. Click `setup.exe` to start the installation.

   If your system does not have a monitor, you can use the Windows 2000 Terminal Services client or **Remote Desktop** (available from the **Maintenance** tab in the Web Administration console) to install the software.

NOTICE: The name of your iSCSI Feature Pack system cannot exceed 15 characters. This is a NetBIOS restriction. If your server name is longer, you must rename it before installing the iSCSI Feature Pack software.

NOTICE: You must use the ANSI machine name for the iSCSI Feature Pack system if you are running the system on a non-English language machine.

NOTE: Your system will be rebooted after the installation.

3. Start your Web Administration console (consult your HP StorageWorks NAS server documentation for instructions). An **iSCSI** tab appears on the Web Administration console. All features related to the iSCSI Feature Pack can be found under this tab.
4. Click on the **Status: Information** message that appears at the top of the console. You will see an alert that your iSCSI Feature Pack system has not been configured. Click to configure the following:
   - Enter key codes to activate the iSCSI Feature Pack.
   - Specify an Internet Storage Name Service (iSNS) server. iSNS facilitates device discovery in storage networks. For the iSCSI Feature Pack, iSNS facilitates the naming, registration, and discovery of iSCSI Logical Units (LU) by host initiators. By default, iSNS is disabled. If you have an external iSNS server, you can set the system to use it. If you do not have an external iSNS server, you can use the local one that is provided by the iSCSI Feature Pack (and runs as an independent Windows service when enabled).
   - The HP NAS 500s, 1200s, and 1500s systems have a single pre-allocated LUN and single file system. To allocate storage to the iSCSI target, create a virtual file-based device using NTFS (NT File System) volume space. You will need to specify how large it should be.
5. Install an iSCSI initiator on each of your host systems.

   iSCSI initiator software/hardware is available from many sources and needs to be installed and configured on all servers that will access shared storage.
   - For Windows hosts, you can download a software initiator from Microsoft's website: http://www.microsoft.com/windowsserversystem/storage/iscsi.mspx
   - For Linux hosts, you can download a software initiator from SourceForge.net: http://sourceforge.net/projects/unh-iscsi
   - For NetWare hosts, you can download a software initiator from Novell's website: http://download.novell.com/pages/PublicSearch.jsp
6. Create your LUs. Refer to the Logical Units section for more details.
7. Add all of your hosts and assign them to your LUs. Refer to the Hosts section for more details.

This document provides all of the information you need to get started with your iSCSI Feature Pack.

Getting Help

If you still have a question after reading this guide, contact an HP authorized service provider or access our web site: http://www.hp.com.

HP Technical Support

Telephone numbers for worldwide technical support are listed on the following HP web site: http://www.hp.com/support. From this web site, select the country of origin.

NOTE: For continuous quality improvement, calls may be recorded or monitored.

Be sure to have the following information available before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

HP Storage Web Site

The HP web site has the latest information on this product, as well as the latest drivers. Access the storage site at: http://www.hp.com/country/us/eng/prodserv/storage.html. From this web site, select the appropriate product or solution.

HP Authorized Reseller

For the name of your nearest HP authorized reseller:

- In the United States, call 1-800-345-1518
- In Canada, call 1-800-263-5868

Elsewhere, see the HP web site for locations and telephone numbers: http://www.hp.com.

Configuring Your iSCSI System

When you select **Configuration** from the main iSCSI screen, the following functions are available:

- **iSNS Configuration** - Specify which iSNS Server to use.
- **Storage** - Manage iSCSI storage devices and pools.
- **Default Portal Template** - Add/delete portals that will be assigned to hosts.
- **License and Version Information** - Enter key codes for licensed components.
- **Server Configuration Files**- Back up and restore the server configuration.
- **Server Diagnostic File** - Capture an X-ray for technical supprort.

iSNS Configuration

iSNS facilitates device discovery in storage networks. For the iSCSI Feature Pack, iSNS facilitates the naming, registration, and discovery of iSCSI Logical Units (LU) by host initiators.

By default, iSNS is disabled. If you have an external iSNS server, you can set the system to use it. If you do not have an external iSNS server, you can use the local one that is provided by the iSCSI Feature Pack. When enabled, it runs as an independent Windows service.

1. Select **Configuration** from the main iSCSI screen.
2. Select **iSNS Configuration**.
3. To use the local iSNS server, select **Use local iSNS** or to use an external iSNS server, select **Use remote iSNS at** and enter the server's IP address.

NOTE: If you do not enable iSNS, you will need to register client initiators with your iSCSI Feature Pack. This enables the server to see the available initiators. Since this procedure can vary by vendor, you should refer to the documentation provided by the vendor.

Storage

Storage includes both disk devices as well as storage pools:

- Pools can be created from raw device hardware RAID sets. Each storage pool can be a group of one or more physical devices. Any disk known to your Windows system that does not have valid partition information is a candidate for a storage pool.
- File-based devices can be created from files on a software volume.

Once created, LUs can be created from the pools/file-based device and assigned to hosts.

When you select **Storage** from the **Configuration** screen, you will see a list of all of your existing iSCSI storage (except imported disks).

Creating a Storage Pool

1. Select **Configuration** from the main iSCSI screen.
2. Select **Storage**.
3. Click **New Pool**.
4. Enter a name for the pool.
5. Select one or more available devices to include in the pool.

Adding/Removing Devices From a Storage Pool

1. Click the checkbox to the left of the pool you want to modify.
2. Click **View Devices.**

   You will see a list of all iSCSI storage. Information about each device, including size, type, and usage is included here. You can click on the device name to see how the segments of the device are being used.
3. Select the devices that should be in this pool.

Merging Storage Pools

1. Click the checkbox(es) to the left of the pool(s) you want to merge.

   You can select to merge two or more pools.
2. Click **Merge Pools.**
3. Specify a name for the new pool.

Deleting a Storage Pool

NOTE: You can only delete a pool if it is empty or if all of the devices in the pool have zero usage.

1. Click the checkbox(es) to the left of the pool(s) you want to delete.
2. Click **Delete Pool.**
3. Click **OK** to confirm the deletion.

Creating a File-Based Device

1. Click **Create File Device.**
2. Select the volume and specify how much space should be used from this volume.

Expanding a File-Based Device

If you did not use the entire volume to create your file-based device, you can expand it as more storage is needed.

To expand a file-based device:

1. Click the checkbox to the left of the file-based device.
2. Click **Expand File Device**.
3. Indicate how much space to add and click **OK**.

Deleting a File-Based Device

NOTE: You can only disable a file-based device if it is not being used.

1. Click the checkbox to the left of the file-based device.
2. Click **Delete File Device.**
3. Click **OK** to confirm.

Viewing Device Layout

You can see how the segments of a device are being used, including whether it contains LUs.

To view device layout for an iSCSI storage device that is not in a pool:

1. Click the checkbox to the left of the device you want to view.
2. Click **View Device Layout.**

To view device layout for a storage pool:

1. Click the checkbox to the left of the pool you want to view.
2. Click **View Devices.**
3. Click on the device name.

Adopting a Device

You can adopt a *foreign* iSCSI Feature Pack disk for the purposes of disaster recovery.

A foreign disk is a physical device containing iSCSI LUs previously set up on a different iSCSI Feature Pack system. You might need to adopt a disk if an iSCSI Feature Pack system is damaged and you want to import the server's disks to a new system.

NOTICE: We highly recommend that you adopt a device into a new, clean iSCSI Feature Pack system that does not have any LUs created.

1. Click **Adopt Devices**.
2. Select the device you would like to import.
3. Click **OK**.

   You click the **Rescan** link to refresh the list of available devices.

Default Portal Template

Portals are access points used by hosts to communicate with the iSCSI Feature Pack. Each portal is a combination of an IP address, port number, and port group number.

By default, the iSCSI Feature Pack assigns each new host one portal for each network interface card (NIC) IP address used by the iSCSI Feature Pack, with the default iSCSI port number 3260 and group 0.

The Default Portal Template screen lets you set the template that will be used when new hosts are created. In other words, the portals listed on this screen will be offered to each new host. You may then want to customize the portals for a specific host so that, for example, each host uses a separate NIC or port.

To add/remove portals:

1. Select **Configuration** from the main iSCSI screen.
2. Select **Default Portal Template**.
3. To add a new portal, click **Add**, select an IP address, and enter a port number and port group.

   To delete a portal, click the checkbox to the left of it and click **Remove**.

License and Version Information

To enter key codes for iSCSI Feature Pack components in order to activate the components:

1. Select **Configuration** from the main iSCSI screen.
2. Select **License and Version Information**.

   A list of all licensed components is displayed.
3. Click **Add**.
4. Enter the key code for the component.

Server Configuration Files

Your iSCSI Feature Pack provides a convenient way to protect your configuration, including host assignments and storage pools. You should save the configuration any time you change it.

To **save the configuration** perform the following steps:

1. Select **Configuration** from the main iSCSI screen.
2. Select **Server Configuration Files**.
3. Click **Backup** to back up data to a local system.
4. Specify a location for the file.

You can restore your iSCSI Feature Pack configuration from a file that was created using **Backup**. Changes made since the configuration was last saved will not be included in the restored configuration. In addition, actual LUs that may have been deleted after the configuration was saved will not be re-created.

NOTE: Restoring a configuration will overwrite existing configuration files and you will lose your current connection. The restoration function is for disaster recovery purposes and should not be used in the day-to-day operation of the server.

To **restore the configuration** perform the following steps:

1. Select **Configuration** from the main iSCSI screen.
2. Select **Server Configuration Files**.
3. Locate the saved file and click **Restore**.

   By default, the name of backed up file is: **iscsicfg.tgz**

   The iSCSI Feature Pack will be restarted once the restoration is complete.

Server Diagnostic File

The iSCSI Feature Pack has a built-in diagnostic feature that captures information about your server into a file that can be sent to HP's technical support team.

To create a diagnostic File:

1. Select **Configuration** from the main iSCSI screen.
2. Select **Server Diagnostic File**.
3. Select **Create Diagnostic File**.
4. Specify a path for the file.

Logical Units

A Logical Unit (LU) is a logically mapped disk device that is created from a physical device or from a storage pool.

Hosts (file and application servers) do not have access to physical resources; they have access only to LUs. This means that physical resources must be defined as LUs first, and then assigned to hosts so they can access them.When a LU is assigned to a host, the host views the LU as its own attached storage device.

LUs offer the added capability of disk expansion. Additional storage blocks can be allocated from the LU's physical device or storage pool and appended to the end of the existing LU without erasing the data on the disk. Each LU may be expanded up to 2 TB.

When you select **Logical Units** from the main iSCSI screen, you will see a list of all existing LUs. Information about each LU is included here. To search for a specific LU, type its name (or a few letters) and click **Go**. Only those LUs that match the letters you typed will be displayed.

From the **Logical Units** screen, the following functions are available:

- **New** - Create a new LU and assign it to a host.
- **Import** - Import a hard drive with existing data to take advantage of the iSCSI Feature Pack's storage services.
- **Delete** - Delete a LU.
- **View Layout** - See where a LU's components are located.
- **Expand** - Increase the size of a LU.
- **Hosts** - Change the host assignment or access rights for a LU.
- **Properties** - View configuration of a LU or change the LU name.

Creating a New Logical Unit

NOTE: If you want a LU to include storage from multiple physical devices, you need to create a storage pool before creating the LU. Refer to the Configuring Your iSCSI System section for more details.

1. Select **Logical Units** from the main iSCSI screen.
2. Click **New**.
3. Enter a name for the new LU.

4. Select the location of the storage for the LU.

   The storage can be from a physical device or storage pool (composed of one or more physical devices) or, for systems with external storage, from raw devices available to the iSCSI Feature Pack.

   If you need to modify your RAID system to allocate additional space for your LU, click the link **Click here to add raid set**. Afterwards, click **Click here to force a rescan of the devices**.

5. Enter a **Size** for the LU.

   The minimum size for each LU is 20 MB.

6. Assign one or more hosts to the newly created LU and assign access rights for each.
   - **No Access** - This host cannot access this LU.
   - **Read Only** - This host will have read-only access to the LU.

   NOTE: If you set Read Only access rights for a LU that contains an NTFS partition, that partition will only be readable in Windows 2003. The LU will not show up properly in Windows versions prior to 2003.

   - **Read/Write Exclusive**- Only this host can access the LU. The host has both read and write access. All others (including Read Only) will be denied access.
   - **Read/Write Non-Exclusive** - Two hosts can connect at the same time with both read and write access.

   NOTICE: There is a potential for data corruption if you set the access rights to Read/Write Non-Exclusive and you have multiple hosts writing to a device at the same time.

7. Confirm all information and click **Finish** to create the LU.

   NOTE: In order for a host to use the newly created LU, you will have to take operating system-specific actions in order for the host to see the new storage. For example, with Windows you must rescan disks via the system's *Computer Management* (available through the *Control Panel*). You will then need to write a signature, create a partition, and format the drive so that the host can use it.

Importing a Logical Unit

(This feature is only available on systems with external storage.) The Import feature allows you to create a LU from an existing disk. Hard drives with existing data can be imported to make use of the iSCSI Feature Pack's functionality without any migration/copying or modification of data.

This can be useful for protecting your existing local iSCSI virtual disks (used for file sharing) because it allows you to import each disk as a LU to take advantage of the iSCSI data services.

Because imported disks are preserved intact, the devices are not virtualized and cannot be expanded. Imported disks are all maintained in a one-to-one mapping relationship (one physical disk equals one logical device). Unlike virtual devices, they cannot be combined or divided into multiple LUs.

In order to import a hard disk, it must be one of the following:

- Raw disk (no partitions)
- Non-boot, non-virtual disk with volumes that are not mounted and do not contain any iSCSI file devices

If you want to import a disk with existing data, you must unmount all volumes on the disk (i.e. unassign all drive letters) in order to make it available for import.

To import a disk:

1. On the **Logical Units** screen, click **Import**.
2. Enter a **Name** for the LU that is being created.
3. Select the disk to import.
4. Select the location where the disk information will be stored.

   NOTE: About 7 MB of disk space is needed to store information about the imported disk.
5. Click **OK**.

   You will see the imported disk listed with your other LUs. The **Type** will be listed as **Import**.

   NOTICE: Once a disk is imported, it should not be mounted by the local operating system.

Viewing Layout

You can see where a LU's components are allocated (devices and sectors).

To view the layout:

1. On the **Logical Units** screen, click the checkbox to the left of the LU that you want to view.
2. Click **View Layout**.

Expanding a Logical Unit

Because virtualized LUs do not represent actual physical resources, they can be expanded as more storage is needed. The LU can be increased in size by adding more blocks of storage from unallocated space on the LU's physical device or storage pool.

Remember that you will still need to repartition the virtual devices and adjust/create/resize any file-systems on the partition after the virtual device is expanded. Because partition and file-system formats are specific to the operating system that the host is running, you must perform these tasks directly from the host. You can use tools like PartitionMagic® or Veritas Volume Manager™ to add more drives to expand existing volumes on the fly in real time (without application down time).

To expand a LU:

1. On the **Logical Units** screen, click the checkbox to the left of the LU that you want to expand.
2. Click **Expand**.
3. Indicate how much space to add and click **OK**.

NOTICE: In order for a host to access the newly expanded LU, you will have to take operating system-specific actions. If you are using the Microsoft iSCSI initiator, you need to launch the initiator software on the host machine and log off (from the **Active Sessions** tab) and then log on (from the **Available Targets** tab). This will temporarily disconnect the host.

Assigning/Unassigning a Host to a Logical Unit

While you generally assign a host to a LU when you create the LU, at any time you can change the host assignment. To do this:

1. On the **Logical Units** screen, click the checkbox to the left of the LU whose assignment you want to change.
2. Click **Hosts**.
3. Assign one or more hosts to the LU and assign access rights for each.

   If you change the access rights for a host, you must go to your initiator software and re-login to the server in order for the change to take effect. If you are using the Microsoft iSCSI initiator, you need to launch the initiator software on the host machine and log off

(from the **Active Sessions** tab) and then log on (from the **Available Targets** tab). This will temporarily disconnect the host.

NOTE: In order for an existing host to access this newly assigned LU, you will have to take operating system-specific actions in order for the host to see the new storage. For example, with Windows you must rescan disks via the system's *Computer Management* (available through the *Control Panel*). You will then need to write a signature, create a partition, and format the drive so that the host can use it.

Viewing Logical Unit Properties

You can view the configuration of a LU or change the LU's name. To do this:

1. On the **Logical Units** screen, click the checkbox to the left of the LU whose properties you want to view.
2. Click **Properties**.
3. If you want to change the LU's name, type a new name in the box and click **OK**.

Deleting Logical Units

You can delete one or more LUs. All data on the LU will be deleted and the space occupied by the LU will become available for a new LU.

NOTE: You should not delete a LU if a host is attached to it.

To delete a LU:

1. On the **Logical Units** screen, click the checkbox(es) to the left of the LU(s) you want to delete.
2. Click **Delete.**
3. Click **OK** to confirm the deletion.

Hosts

Hosts are the file and application servers that access Logical Units (LU). When a LU is assigned to a host, the host views the LU as its own attached storage device. Because LUs appear as locally attached devices, applications (such as file servers, databases, Web and e-mail servers) do not need to be modified to utilize the storage.

When you select **Hosts** from the main iSCSI screen, you will see a list of all existing hosts. To search for a specific host, type its name (or a few letters) and click **Go**. Only those hosts that match the letters you typed will be displayed.

From the **Hosts** screen, the following functions are available:

- **New** - Add a new host.
- **Delete** - Delete existing hosts.
- **Initiators** - Manage host initiators.
- **Logical Units** - Manage the LUs assigned to the host.
- **Portals** - Manage the IP portals that the host uses to communicate with the iSCSI Feature Pack.
- **Properties** - View configuration of a host or change authentication type.

Creating a New Host

When you create a new host, you select its authentication mode, define its initiators, and assign it LUs. By default, each new host is assigned one portal for each network interface card (NIC) IP address used by the iSCSI Feature Pack. Hosts use portals to communicate with the iSCSI Feature Pack. The portal that is initially assigned is determined by the **Default Portal Template**, which can be modified from the **Configuration** screen. After a host is added, you can change its portal via the **Portals** function, if necessary.

To create a new host:

1. Select **Hosts** from the main iSCSI screen.
2. Click **New**.
3. Enter a name for the host.

   You must use the ANSI machine name for the host machine if you are running the system on a non-English language machine.
4. Indicate how the host should connect to the server.

What you select depends on where the host is located and how secure you require your connection to be. For most environments, the server IP address is sufficient and is the most secure. However, if the host is remotely located across a firewall and you do not have VPN access, you can use the *Server DNS Name,* assuming your iSCSI initiator/HBA supports this. Note that using a VPN with the server address is the more secure way to communicate across a WAN.

NOTE: The host name that the host communicates with the server as must be a public name that can be pinged from the host.

5. Select the level of authentication between the Server and the Host Initiator(s):
   - **Anonymous** - No authentication.
   - **CHAP** - Hosts must authenticate using Challenge Handshake Authentication Protocol (CHAP). You will have to enter a username and secret that the host must know when connecting to the server.
   - **Mutual CHAP** - Requires both the server and host to authenticate using CHAP. You will have to enter a username and secret for both systems.
6. Select the iSCSI initiators that this host will use.

   Known iSCSI initiators are listed in the dropdown box. If you do not see your initiator, you can manually add it. You can also register your host initiators with your iSCSI Feature Pack so that they become known to the iSCSI Feature Pack. If you are using the Microsoft iSCSI initiator, run **Microsoft iSCSI Initiator** on the host machine. You can find the program in the Control Panel or on your desktop (if you are the user that installed it). Click **Add** on the **Target Portals** tab and enter the IP address or name (if resolvable) of the iSCSI Feature Pack. Use the default socket. If you get a message that it has been rejected after you click OK to add, ignore it. Once the host attempts to communicate with the iSCSI Feature Pack, information will be stored about the host's initiators.

   If you are using a different iSCSI initiator (not the Microsoft iSCSI Initiator), refer to the documentation that was provided by the vendor.

   NOTE: A host can have multiple initiators, including network interface cards (NICs) and Host Bus Adapters (HBAs). Be sure to select all initiators from the same host machine.
7. Assign one or more LUs to the newly created host and assign access rights for each.
   - **No Access** - This host cannot access this LU.
   - **Read Only** - This host will have read-only access to the LU.

   NOTE: If you set Read Only access rights for a LU that contains an NTFS partition, that partition will only be readable in Windows 2003. The LU will not show up properly in Windows versions prior to 2003.

- **Read/Write Exclusive**- Only one host can access this LU at a time. All others (including **Read Only**) will be denied access.
- **Read/Write Non-Exclusive** - Two hosts can connect at the same time with both read and write access.

NOTICE: There is a potential for data corruption if you set the access rights to Read/Write Non-Exclusive and you have multiple hosts writing to a device at the same time.

NOTE: If you do not assign any LUs to this host, after the host is created, the **Status** field will display **Not Connected**.

8. Confirm all information and click **Finish** to create the host.

   The **Status** field will display **Connected** if the host is assigned at least one LU.

NOTE: In order for a host to use the newly created LU, you will have to take operating system-specific actions in order for the host to see the new storage. For example, with Windows you must rescan disks via the system's *Computer Management* (available through the *Control Panel*). You will then need to write a signature, create a partition, and format the drive so that the host can use it.

Managing Host Initiators

The iSCSI Feature Pack can use an iSNS Server from any iSCSI Feature Pack to locate existing iSCSI initiators. However, each initiator can only be associated with a single host.

To add or delete initiators for a host:

1. On the **Host** screen, click the checkbox to the left of the host that you want to manage.
2. Click **Initiators**.

   A list of existing initiators for this host is displayed along with any iSCSI initiator alias.
3. To add a new initiator, click **Add.**

   You can then select from the automatically discovered initiators or you can manually enter initiators.
4. To delete an initiator, click the checkbox to the left of it and click **Remove**.

Managing the LUs Assigned to a Host

To change a host's LU assignments or access rights:

1. On the **Host** screen, click the checkbox to the left of the host whose assignment you want to change.
2. Click **Logical Units**.

3. Assign one or more available LUs to the host and assign access rights for each.

   If you change the access rights for a host, you must go to your initiator software and re-login to the server in order for the change to take effect. If you are using the Microsoft iSCSI initiator, you need to launch the initiator software on the host machine and log off (from the **Active Sessions** tab) and then log on (from the **Available Targets** tab). This will temporarily disconnect the host.

   NOTE: In order for an existing host to access this newly assigned LU, you will have to take operating system-specific actions in order for the host to see the new storage. For example, with Windows you must rescan disks via the system's *Computer Management* (available through the *Control Panel*). You will then need to write a signature, create a partition, and format the drive so that the host can use it.

Managing Portals

Portals are access points used by hosts to communicate with the iSCSI Feature Pack. Each portal is a combination of an IP address, port number, and port group number.

The iSCSI Feature Pack assigns each new host one portal for each NIC IP address used by the iSCSI Feature Pack. By default, the portal is a combination of the default iSCSI port number 3260 and group 0. This default can be changed through the **Default Portal Template** from the **Configuration** screen.

You may want to customize the portals for a specific host. For example, if you have four NICs, you may want to assign two for your messaging server and two for your database so that the communication traffic from one host does not overwhelm the other. Taking this example further, you can put the NICs for your messaging server in the same group or in two different groups. If they are in the same group, the host will communicate via both NICs, providing redundancy should one NIC fail. If the NICs are put into separate groups, there will be two independent paths with no redundancy.

You may also need to modify the port number that your portal uses. This would be necessary if the default port number (3260) is used by another application or if your firewall blocks the default port number.

NOTE: You should take care to remove any non-active portals from the list of portals for the host. Otherwise, the host may encounter connection problems.

To add/delete the portals for a host:

1. On the **Host** screen, click the checkbox to the left of the host that you want to manage.
2. Click **Portals**.

   A list of existing portals is displayed.

3. To add a new portal, click **Add,** select an IP address and enter a port number and port group.

   You cannot change a portal; You can remove and then add a portal.

4. To delete a portal, click the checkbox to the left of it and click **Remove**.

Viewing Host

To view the configuration of a host or change the authentication type or host resolution:

1. On the **Host** screen, click the checkbox to the left of the LU whose properties you want to view.
2. Click **Properties**.
3. If you want to change the authentication type, select it and then enter the appropriate username(s) and secret(s).

   NOTE: You cannot change the authentication type while the host is connected to a LU.

4. If you want to change how this host should connect to the server, select the resolution method.

Deleting Hosts

You can delete one or more hosts. Any LU assignment to this host will be lost (but the data on the LUs themselves remains intact). If you decide to re-create the host at a later time, you will have to re-assign LUs to it.

NOTE: You should not delete a host if it is attached to a LU.

To delete a host:

1. On the **Host** screen, click the checkbox(es) to the left of the host(s) you want to delete.
2. Click **Delete.**
3. Click **OK** to confirm the deletion.

Command Line Interface

The iSCSI command line utility (iSCSICLI) provides a non-graphical interface for configuring and querying the iSCSI system. The main purpose of the iSCSICLI is for use in unattended/automated scripting through use of batch files and the Windows scheduler.

Command Line Basics

The iSCSICLI receives its input in the form of global options, commands, and parameters. Generally these are supplied to the CLI in this order.

Any error messages are directed to standard error (stderr), whereas output from query-type commands (for example, to show known hosts in the system) is directed to standard output (stdout).

Command Line Overview

The basic command line usage model is:

```
iscsicli [/server:server] [/user:username] [/pw:password] [/q]
<command> <operation> [parameters]
```

As an example, to display a formatted list of all physical storage:

```
iscsicli device show
```

Global Options

These represent the command line options to control system wide modes and features of the command line. These are required to be the first arguments provided to the CLI.

Command Classes

The command classes represent the primary operational categories of the command line. Each category contains operations and parameters. Commands are entered directly on the command line.

The primary command classes are:

Command Class	Description	Operations
Device	Storage in the form of physical disks	Reserve, release, adopt, rescan, layout, show, showforeign
File	Storage in the form of files	Create, delete, expand, and show

Command Class	Description	Operations
Pool	Collection of one or more physical devices or files	Create, delete, rename, add, remove, merge, and show
Host	iSCSI host that makes use of the logical units (LUs)	Create, delete, add, remove, addportal, removeportal, assign, unassign, setaccess, setauth, setresolve, and show
LU	LUs (as viewed by a host) allocated from a storage pool	Create, import, delete, rename, expand, assign, unassign, setaccess, layout, and show
Configuration	Configuration settings	Backup, restore, xray
iSNS	iSNS settings	Setmode and show
iSCSI	iSCSI settings	Add, remove, reset, show, addportal, removeportal, removeallportals, and showportal

Command Parameters

Parameters are specified using the parameter name and the value separated by an equal sign. For example:

```
Poolname=MyNewsPool
```

Parameter values that contain spaces must be enclosed in double-quotes:

```
"Poolname=My News Pool"
```

The parameter definition table contains a type field that can contain one of the following values:

- R – Required parameter
- C – Conditional parameter, may be required based on other parameters
- O – Optional parameter

Command Line Status

Success or failure of a requested operation can be determined through examination of the command exit code: %ERRORLEVEL%

Possible return codes are:

- 0 – successful execution of request
- 1 – must run command as Administrators
- 2 – unable to login to iSCSI Feature Pack

- 3 – invalid option
- 4 – invalid command
- 5 – invalid operation
- 6 – invalid parameter
- 7 – missing one or more required parameters
- 101 – remote iSCSI Feature Pack not found
- 102 - file i/o or system API failure
- 103 – failed to allocate memory
- 104 – internal failure (data corruption)

Global Options

iSCSICLI recognizes the following global options.

Remote iSCSI Feature Pack (/server)

Specify the iSCSI Feature Pack that you wish to query/configure. If no server is specified then the operations are assumed to be directed to the machine your running the iSCSICLI from; the local host. The complete definition of this option is:

```
/server:servername
```

Remote iSCSI Feature Pack User & Password (/user, /pw)

When configuring a remote iSCSI Feature Pack, the login credentials for this server will be required. The complete definition of this option is:

```
/user:username /pw:password
```

Display Usage and Help (/h)

Show basic command line syntax.

Quiet Mode (/q)

Suppresses the output of informational and error messages to stderr. Success or failure of the requested operation can be determined by examining the return code (see **Command Line Status**).

Device Commands

Physical storage represents physical disks and disk volumes.

The operation class name is: **device**

Under the device operational class you can specify the following sub-operations:

reserve

Assign physical devices to an iSCSI Storage Pool.

Parameter	Type	Description
Device	R	The physical device to reserve for use by iSCSI. The format is: adapter:bus:target:lun
Pool	R	Pool to add the storage into. The pool must already exist.

Example:

```
iscsicli device reserve device=0:0:0:2 pool=Pool1
```

release

Remove a physical device from an iSCSI Storage Pool.

Parameter	Type	Description
Device	R	The physical device to release (free) from use by iSCSI. The format is: adapter:bus:target:lun
Pool	R	Pool to remove the storage from. The pool must already own the device.

Example:

```
iscsicli device release device=0:0:0:2 pool=Pool1
```

adopt

Adopt a foreign iSCSI disk for the purposes of disaster recovery.

Parameter	Type	Description
Device	R	The physical device to adopt. The format is: adapter:bus:target:lun

Example:

```
iscsicli device adopt device=1:0:0:2
```

rescan

Rescan all physical devices.

Example:

```
iscsicli device rescan
```

layout

Display the layout of resource segments on the device.

Parameter	Type	Description
Device	R	The physical device for which to display the layout. The format is: adapter:bus:target:lun

Example:

```
iscsicli device layout device=0:0:0:2
```

show

Display physical devices, their status and pool associations.

Parameter	Type	Description
Device	O	The physical device to display. The format is: adapter:bus:target:lun If not specified, all physical devices will be displayed.

Example:

```
iscsicli device show device=0:0:0:2
```

showforeign

List disks available to be adopted.

Example:

```
iscsicli device showforeign
```

File Storage Commands

File storage is used on systems where no unused physical disks and/or disk volumes are available.

The operation class name is: **file**

Under the device operational class you can specify the following sub-operations:

create

Create a file to be used by iSCSI.

Parameter	Type	Description
Volume	R	The volume to create the file storage for use by iSCSI. Use the **Device Show** command to see the possible values.
Size	O	Size (in MB) of the file. Default: available space

Example:

```
iscsicli file create volume="\\?\Volume{118be50e-eac1-11d7-a1f7-
505054503030}\" size=2048
```

delete

Remove a file from use and delete the file.

Parameter	Type	Description
Device	R	The physical file based device to delete. The format is: adapter:bus:target:lun

Example:

```
iscsicli file delete device=0:0:0:2
```

expand

Expand a file used by iSCSI.

Parameter	Type	Description
Device	R	The physical file based device to expand. The format is: adapter:bus:target:lun
Size	R	Size (in MB) of the file.

Example:

```
iscsicli file expand device=0:0:0:2 size=1024
```

show

Display file and status.

Parameter	Type	Description
Device	O	The file device to display. The format is: adapter:bus:target:lun

Example:

```
iscsicli file show
```

Storage Pool Commands

By default all physical storage, when reserved, exists within the context of a storage pool. The storage pool can contain one or more physical storage devices of potentially dissimilar categories: disk, volume or file. A storage pool must contain at least one device.

The operation class name is: **pool**

Under the device operational class you can specify the following sub-operations:

create

Create a storage pool.

Parameter	Type	Description
Pool	R	Name of the new storage pool.
Device	O	The physical device to add to the newly created pool. The format is: adapter:bus:target:lun The storage must have been previously reserved.

Example:

```
iscsicli pool create pool=Pool1 device=0:0:0:1
```

delete

Remove a storage pool.

Parameter	Type	Description
Pool	R	Name of the pool.

Example:

```
iscsicli pool delete pool=Pool2
```

rename

Rename a storage pool.

Parameter	Type	Description
Pool	R	Name of the pool.
Newname	R	New name of the pool.

Example:

```
iscsicli pool rename pool=Pool2 "newname=My Pool"
```

add

Add a physical device or file to a storage pool.

Parameter	Type	Description
Pool	R	Name of the pool.
Device	C	The physical device to add to the pool. The format is: adapter:bus:target:lun The storage must have been previously reserved.

Example:

```
iscsicli pool add pool=Pool1 device=0.0.0.4
```

remove

Remove a physical device or file from a storage pool.

Parameter	Type	Description
Pool	R	Name of the pool.
Device	C	The physical device to remove from the pool. The format is: adapter:bus:target:lun

Example:

```
iscsicli pool remove pool=Pool1 device=0.0.0.3
```

merge

Merge storage pools.

Parameter	Type	Description
Pool	R	Name of the first pool.
Pool2	R	Name of the second pool.
Newname	R	Name for the merged pool.

Example:

```
iscsicli pool merge pool=Pool1 pool2=Pool2 "newname=My Pool"
```

show

Display pools.

Parameter	Type	Description
Pool	O	Name of the pool. If not specified, all pools will be displayed.

Example:

```
iscsicli pool show pool=Pool1
```

Host Commands

iSCSI hosts make use of LUs.

The operation class name is: **host**

Under the host operational class you can specify the following sub-operations:

create

Define a new host.

Parameter	Type	Description
Host	R	Name of the new host.
Initiator	R	iSCSI initiator to associate with this host.

Parameter	Type	Description
AuthMode	O	Authentication mode used by this host. Choices: none, chap, mutualchap Default: none
User	C	User name for chap and mutual chap authentication type.
Chap	C	Server/Target Chap secret for chap and mutual chap authentication type.
MutualChap	C	Initiator/Host MutualChap secret for mutual chap authentication type.
ResolveBy	O	How the host should connect to the server. Choices: address, name Default: address
dnsname	C	DNS server name.

Example:

```
iscsicli host create host=MyServer initiator=iqn.1991-
05.com.microsoft:myserver authmode=chap user=user1 chap=secret
ResolveBy=address
```

delete

Remove a defined host.

Parameter	Type	Description
Host	R	Name of the host.

Example:

```
iscsicli host delete host=MyServer
```

add

Add an iSCSI initiator to a host.

Parameter	Type	Description
Host	R	Name of the host.
Initiator	R	iSCSI initiator name to add.

Example:

```
iscsicli host add host=MySQLServer initiator=iqn.1991-
05.com.microsoft:mysqlserver
```

remove

Remove an iSCSI initiator from a host.

Parameter	Type	Description
Host	R	Name of the host.
Initiator	R	iSCSI initiator name to remove.

Example:

```
iscsicli host remove host=MySQLServer initiator=iqn.1991-
05.com.microsoft:mysqlserver
```

addportal

Add an iSCSI portal to a host.

Parameter	Type	Description
Host	R	Name of the host.
Portal	R	iSCSI portal to add to the host. The format is: ipaddress[:port[:group]]

Example:

```
iscsicli host addportal host=MySQLServer portal=10.1.11.72:3260:1
```

removeportal

Remove an iSCSI portal from a host.

Parameter	Type	Description
Host	R	Name of the host.
Portal	R	iSCSI portal to remove from the host. The format is: ipaddress[:port[:group]]

Example:

```
iscsicli host removeportal host=MySQLServer portal=10.1.11.72:3260:1
```

assign

Assign a LU to a host.

Parameter	Type	Description
Host	R	Name of the host.

Parameter	Type	Description
LU	R	LU to assign to the host.
AccessMode	O	Type of access to grant to hosts. Choices: RO, RW, RWE Default: RWE

Example:

```
iscsicli host assign host=MySQLServer lu=LU6 accessmode=RO
```

unassign

Remove the assignment of a LU from a host.

Parameter	Type	Description
Host	R	Name of the host.
LU	R	LU to unassign from the host.

Example:

```
iscsicli host unassign host=MySQLServer lu=LU6
```

setaccess

Change the access mode of a LU for a host.

Parameter	Type	Description
Host	R	Name of the host.
LU	R	LU to assign to the host.
AccessMode	R	Type of access to grant to hosts. Choices: RO, RW, RWE

Example:

```
iscsicli host setaccess host=MySQLServer lu=LU6 accessmode=RWE
```

setauth

Change the authentication for the specified host.

Parameter	Type	Description
Host	R	Name of the host.

Parameter	Type	Description
AuthMode	O	Authentication mode used by this host. Choices: none, chap, mutualchap Default: none
Chap	C	Server/Target Chap secret for chap and mutual chap authentication type.
MutualChap	C	Initiator/Host Mutual Chap secret for mutual chap authentication type.

Example:

```
iscsicli host setauth host=MySQLServer authmode=chap chap=secret
```

setresolve

Change the way the host connects to the server.

Parameter	Type	Description
Host	R	Name of the host.
ResolveBy	R	How the host should connect to the server. Choices: address, name Default: address
dnsname	C	DNS server name.

Example:

```
iscsicli host setresolve host=MyServer ResolveBy=address
```

show

Show information about one or more hosts.

Parameter	Type	Description
Host	R	Name of the host. If not specified, all hosts will be displayed.

Example:

```
iscsicli host show host=MySQLServer
```

Logical Unit Commands

LUs are devices used by the iSCSI hosts.

The operation class name is: **logicalunit** or **lu**

Under the LU operational class you can specify the following sub-operations:

create

Create a new LU.

Parameter	Type	Description
LU	R	Name of the new LU.
Pool or Disk	R	Pool or Disk to provide storage for the LU.
Size	O	Size (in MB) of the new LU. Default: available space
Host	O	Host to assign to the LU.
AccessMode	O	Type of access to grant to hosts. Choices: RO, RW, RWE Default: RWE

Examples:

```
iscsicli lu create lu=LU4 pool=Pool1 size=1024 host=MySQLServer
accessmode=RO
```

```
iscsicli lu create lu=LU4 disk=0:2:2:2 size=1024 host=MySQLServer
accessmode=RW
```

import

Import a physical device as a new LU.

Parameter	Type	Description
LU	R	Name of the new LU.
Device	R	The physical device to import. The format is: adapter:bus:target:lun The storage must have been previously formatted by a supported operating system.
Pool or Disk	R	Pool or Disk to store the header information for the imported physical device.
Host	O	Host to assign the LU.

Parameter	Type	Description
AccessMode	O	Type of access to grant to hosts. Choices: RO, RW, RWE Default: RWE

Example:

```
iscsicli lu import lu=LU5 pool=ImportLU5 host=MySQLServer accessmode=RO
iscsicli lu import lu=LU5 disk=0:2:2:2 host=MySQLServer accessmode=RO
```

delete

Delete a LU.

Parameter	Type	Description
LU	R	Name of the LU.

Example:

```
iscsicli lu delete lu=LU6
```

rename

Rename a LU.

Parameter	Type	Description
LU	R	Name of the LU.
Newname	R	New name of the LU.

Example:

```
iscsicli lu rename lu=LU6 newname=MyLU6
```

expand

Expand a LU.

Parameter	Type	Description
LU	R	Name of the LU.
Size	R	Size (in MB) to add to the LU.

Example:

```
iscsicli lu expand lu=LU6 size=4096
```

assign

Assign a LU to an iSCSI host.

Parameter	Type	Description
LU	R	Name of the LU.
Host	R	Host to assign to the LU.
AccessMode	O	Type of access to grant to hosts. Choices: RO, RW, RWE Default: RWE

Example:

```
iscsicli lu assign lu=LU6 host=MySQLServer accessmode=RW
```

unassign

Remove the assignment of a LU from an iSCSI host.

Parameter	Type	Description
LU	R	Name of the LU.
Host	R	Host to unassign from the LU.

Example:

```
iscsicli lu unassign lu=LU6 host=MySQLServer2
```

setaccess

Change the access mode of a LU for an iSCSI host.

Parameter	Type	Description
LU	R	Name of the LU.
Host	R	Host to assign to the LU.
AccessMode	R	Type of access to grant to hosts. Choices: RO, RW, RWE

Example:

```
iscsicli lu setaccess lu=LU6 host=MySQLServer accessmode=RO
```

layout

Display the layout of the LU and its resources among the physical devices.

Parameter	Type	Description
LU	R	The LU for which to display the layout.

Example:

```
iscsicli lu layout lu=LU6
```

show

Display LU(s).

Parameter	Type	Description
LU	O	Name of the LU. If none specified, all LUs will be displayed.

Example:

```
iscsicli lu show lu=LU9
```

Configuration Commands

Configuration provides maintenance of the configuration data of the iSCSI Feature Pack.

The operation class name is: **configuration**

Under the configuration class you can specify the following sub-operations:

backup

Backup the configuration data to a file.

Parameter	Type	Description
File	R	File to save the configuration data.

Example:

```
iscsicli configuration backup file=C:\MyBackups\iscsiserver.cfg
```

restore

Restore the configuration data from a file.

Parameter	Type	Description
File	R	File that contains the configuration data.

Example:

```
iscsicli configuration restore file=C:\MyBackups\iscsiserver.cfg
```

xray

Create an xray file for technical support.

Parameter	Type	Description
File	R	File to save the xray information.

Example:

```
iscsicli configuration xray file=C:\support\iscsixray.cab
```

iSNS Commands

The iSCSI Feature Pack includes the ability to operate with a local iSNS Server as well as other remote iSNS Servers.

The operation class name is: **isns**

Under the iSNS operational class you can specify the following sub-operations:

setmode

Change iSNS settings.

Parameter	Type	Description
iSNSMode	R	iSNS Mode Choices: Off, Local, Remote
IP	C	IP address of the remote iSNS Server.

Example:

```
iscsicli isns setmode isnsmode=off
iscsicli isns setmode isnsmode=local
iscsicli isns setmode isnsmode=remote ip=10.1.11.69
```

show

Display iSCSI initiators or iSCSI targets listed in the iSNS database, or iSNS settings.

Parameter	Type	Description
Detail	O	Information to display Choices: Settings, Initiators Default: Settings

Example:

```
iscsicli isns show detail=targets
```

iSCSI Commands

The operation class name is: **iscsi**

Under the iSCSI operational class you can specify the following sub-operations:

add

Add license for a specified module that is installed on the iSCSI Feature Pack.

Parameter	Type	Description
License	R	License Keycode

Example:

```
iscsicli iscsi add license=12345678
```

remove

Remove a license for a specified module that is installed on the iSCSI Feature Pack.

Parameter	Type	Description
License	R	License Keycode

Example:

```
iscsicli iscsi remove license=12345678
```

show

Show the options installed on the iSCSI Feature Pack.

Parameter	Type	Description
Detail	O	Information to display Choices: Version, Options Default: Version

Example:

```
iscsicli iscsi show detail=version
```

addportal

Add an iSCSI portal to the default global template. The portals within the global portal template are assigned to a host when a host is created.

Parameter	Type	Description
Portal	R	iSCSI portal to add. The format is: ipaddress[:port[:group]]
Global	O	Add the portal to all hosts as well as the default global template. Choices: No, Yes Default: No

Example:

```
iscsicli iscsi addportal portal=10.1.11.72:3260:1 global=yes
```

removeportal

Remove an iSCSI portal from the default global template. The portals within the global portal template are assigned to a host when a host is created.

Parameter	Type	Description
Portal	R	iSCSI portal to remove. The format is: ipaddress[:port[:group]]
Global	O	Delete the portal from all hosts as well as the default global template. Choices: No, Yes Default: No

Example:

```
iscsicli iscsi removeportal portal=10.1.11.72:3260:1 global=no
```

removeallportals

Remove all iSCSI portals from the default global template.

Example:

```
iscsicli iscsi removeallportals
```

showportal

Lists all portals within the global portal template.

Example:

```
iscsicli iscsi showportal
```

Glossary

Host: File and application servers that access Logical Units.

Internet Storage Name Service (iSNS): Facilitates device discovery in storage networks. For the iSCSI Feature Pack, iSNS facilitates the naming, registration, and discovery of iSCSI Logical Units by host initiators. Your HP iSCSI Feature PackHP includes iSNS software that can be activated if Microsoft's iSNS software is not available.

iSCSI Initiator: Devices which request, or initiate, iSCSI data writes and reads. Each host can have multiple initiators, depending upon the number of network interface cards (NICs) that it has. However, each initiator can only be associated with a single host.

Logical Unit (LU): The basic unit of iSCSI storage, a LU is a logically mapped disk device that is created from a physical disk or from a storage pool.

Physical Disk: A single, physical hard disk.

Raw disk: A portion of a physical disk. The contents of a raw disk are not managed by the operating system and cannot be accessed by users (unlike with file systems).

Storage Pool: A group of one or more physical devices from a hardware RAID set (on systems with external storage).

Virtual Disk: A collection of one or more physical disks that are members of the same RAID set configured by a hardware RAID controller or the Windows operating system. A virtual disk is seen by the operating system as a single disk. When using hardware RAID, the RAID functioning is hidden from the operating system.

R

S

T

W